Advanced Research Projects Agency • ENERGY

SOLAR ADEPT PROJECT

UNIVERSITY OF COLORADO BOULDER

INTEGRATED SOLAR POWER CONVERTERS

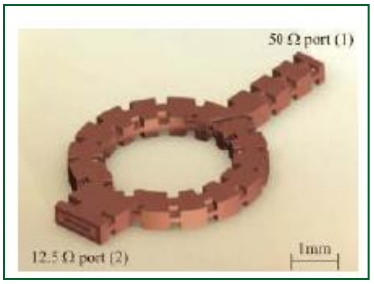
PROJECT TITLE:	Wafer-Level Sub-Module Integrated DC/DC Converter		
ORGANIZATION:	University of Colorado Boulder (CU-Boulder)	LOCATION:	Boulder, CO
PROGRAM:	Solar ADEPT	ARPA-E AWARD:	$1,049,987
TECH TOPIC:	Power Conversion	PROJECT TERM:	2/9/12 – 2/8/15
WEBSITE:	arpae.energy.gov/ProgramsProjects/SolarADEPT		

CRITICAL NEED

Photovoltaic (PV) solar systems convert the sun's energy into electricity, but only a small percentage of the sunlight that reaches a PV system is converted into useful electricity. This is due in part to the inefficient and failure-prone electrical components used in most PV systems today. Improving the performance of these components would lower the overall cost of PV systems—helping to make renewable solar energy cost-competitive with conventional, nonrenewable forms of electricity generation.

PROJECT INNOVATION + ADVANTAGES

CU-Boulder is developing advanced power conversion components that can be integrated into individual solar panels to improve energy yields. The solar energy that is absorbed and collected by a solar panel is converted into useable energy for the grid through an electronic component called an inverter. Many large, conventional solar energy systems use one, central inverter to convert energy. CU-Boulder is integrating smaller, microconverters into individual solar panels to improve the efficiency of energy collection. The University's microconverters rely on electrical components that direct energy at high speeds and ensure that minimal energy is lost during the conversion process—improving the overall efficiency of the power conversion process. CU-Boulder is designing its power conversion devices for use on any type of solar panel.



IMPACT

If successful, CU-Boulder would significantly improve the energy capture and power conversion processes in solar power systems—helping to improve their performance and reduce their operating costs.

- SECURITY: Lowering the cost of PV systems would help increase the use of solar energy, which in turn would decrease our dependence on fossil fuels and improve U.S. energy security.
- ENVIRONMENT: Solar energy systems create zero harmful emissions while providing energy to homes and businesses, so their widespread use would significantly improve air quality.
- ECONOMY: This project could help position the U.S. as a leader in the power electronics industry.
- JOBS: Widespread use of residential and commercial PV systems could create jobs for system installers, technicians, and salespeople.

CONTACTS

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National Renewable Energy Laboratory